Exelon Nuclear

10CFR50.73

May 19, 2008

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Limerick Generating Station, Unit 1
Facility Operating License No. NPF-39
NRC Docket No. 50-352

Subject: LER 2008-002-00, Automatic Actuation Of The Reactor Protection System At Power

This Licensee Event Report (LER) addresses an event that resulted in an automatic actuation of the reactor protection system (RPS) at power. An invalid power/load unbalance circuit actuation tripped the generator protection lockout relays, which resulted in a Main Turbine trip.

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

There are no commitments contained in this letter.

If you have any questions or require additional information, please do not hesitate to contact us.

Sincerely,

Original signed by Edward W. Callan for

Christopher H. Mudrick
Vice President - Limerick Generating Station
Exelon Generation Company, LLC

cc: S. J. Collins, Administrator Region I, USNRC
E. M. DiPaolo, USNRC Senior Resident Inspector, LGS

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104 EXPIRES 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

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4. TITLE:
Automatic Actuation Of Reactor Protection System Due To Invalid Power/Load Unbalance Condition

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
										05000
03	22	2008	2008	- 002 -	00	05	19	2008	FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE
1

10. POWER LEVEL
87

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*

☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER *(Include Area Code)*
Robert E. Kreider, Manager – Regulatory Assurance	610-718-3400

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	TB	RLY	G080	Y					

14. SUPPLEMENTAL REPORT EXPECTED

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

A valid automatic actuation of the reactor protection system occurred as a result of an invalid power/load unbalance actuation. This invalid power/load unbalance actuation caused an actuation of the main generator protection lockout relays, which resulted in a Main Turbine trip. The root cause of this event was the main generator protection relay logic that failed due to a defective relay. The main generator relay testing procedures will be revised to include a circuit loop signal verification test to ensure reliability of newly installed equipment.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A) (17)*

Unit Conditions Prior to the Event

Unit 1 was in Operational Condition (OPCON) 1 (Power Operation) at approximately 87% power. There were no structures, systems or components out of service that contributed to this event.

Description of the Event

On Saturday March 22, 2008, Limerick Unit 1 was operating at approximately 87% power with power ascension in progress. At approximately 19:39 hours, an automatic actuation of the reactor protection system (RPS) (EIIS:JC) occurred. The actuation of RPS was caused by a main turbine control valve fast closure signal from a main turbine trip. The operators entered the trip procedure for reactor pressure vessel (RPV) control (T-101) and stabilized reactor parameters. All control rods fully inserted.

Reactor wide range level indication decreased to -3.0 inches and then stabilized at +35 inches. Reactor pressure was approximately 1015 psig prior to the automatic scram, peaked at 1120 psig, and stabilized at approximately 955 psig after the scram. The reactor high-pressure scram setpoint of 1096 psig was exceeded but RPS had previously initiated due to the main turbine control valve closure. The redundant reactivity control system (RRCS) setpoint of 1149 psig was not exceeded. The lowest main steam relief valve (MSRV) setpoint of 1170 psig was not exceeded; therefore, no MSRVs actuated. The main steam bypass valves opened as designed to control pressure post scram.

Primary containment isolation signals were automatically initiated at +12.5 inches reactor level. A Group 2 isolation occurred at +12.5 inches but the isolation valves were in the closed position prior to the event. The reactor recirculation pumps motor-generator set breakers tripped due to the main generator lockout.

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A) (17)*

An investigation determined that an invalid power/load unbalance (PLU) condition actuated the main generator protection relays (EIIS:RLY) resulting in a Main Turbine trip with a subsequent automatic actuation of RPS. The invalid PLU condition was caused by a relay internal failure, which affected the main generator load input signal to the PLU circuit.

This event resulted in an actuation of RPS when the reactor was critical and a valid actuation of RPS. The 4-hour ENS notification required by 10CFR50.72(b)(2)(iv)(B) and the 8-hour notification required by 10CFR50.72(b)(3)(iv)(A) were performed on Saturday March 22, 2008 at 2050 hours (#44088).

This event resulted in an automatic actuation of RPS. Therefore, this LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv)(A).

Analysis of the Event

There were no actual safety consequences associated with this event. The potential safety consequences of this event were minimal. A turbine trip with bypass transient is categorized as an incident of moderate frequency per UFSAR section 15.2.3, "Turbine Trip". The plant equipment performed as designed during the transient and the operators effectively stabilized reactor parameters.

Failure analysis of the degraded main generator over current relay determined a relay tap screw was cross-threaded into a bus bar resulting in inadequate tap screw seating. The inadequately seated tap screw increased the resistance in the circuit, which caused an internal flashover between the A and B phases.

The electro hydraulic control (EHC) power/load unbalance circuit monitors main turbine power and main generator load. If power exceeds load by greater than 40 percent the circuit actuates the main generator protection relays. Main turbine cross around steam pressure provides the power input and the main generator megawatt signal is the load input.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

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NARRATIVE *(If more space is required, use additional copies of NRC Form 366A) (17)*

Cause of the Event

The automatic RPS actuation was caused by a Main Turbine trip, which resulted from a Main Generator lockout. The lockout was the result of an invalid actuation of the PLU circuit, which was caused by a relay internal failure.

The root cause of this event was the generator protection relay logic failed due to a defective relay.

Corrective Action Completed

The degraded relay was removed from service and isolated from the PLU circuit inputs.

Corrective Action Planned

The main generator relay testing procedures will be revised to include a circuit loop signal verification test to ensure reliability of newly installed equipment.

Previous Similar Occurrences

There were no previous similar occurrences of a scram caused by a malfunction in the PLU circuit in the past three years.

Component data:

Component description:	Main Generator Overcurrent Relay
Component number:	350-G101
Manufacturer:	G080 General Electric Company
Model number:	12SBC31A1D